PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 21 February 2001 (21.02.01)	
International application No. PCT/SE00/01180	**Applicant's or agent's file reference** PCT 51496sb
International filing date (day/month/year) 07 June 2000 (07.06.00)	**Priority date** (day/month/year) 10 June 1999 (10.06.99)
Applicant ÄLVEBY, Nils	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

02 January 2001 (02.01.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

R. E. Stoffel

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

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INFORMATION CONCERNING ELECTED OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

To:

BERGLUND, Stefan
Bjerkéns Patentbyrå KB
Östermalmsgatan 58
S-114 50 Stockholm
SUÈDE

RECEIVED
BJERKENS

Date of mailing (day/month/year) 21 February 2001 (21.02.01)	
Applicant's or agent's file reference PCT 51496sb	**IMPORTANT INFORMATION**

International application No.	**International filing date** (day/month/year)	**Priority date** (day/month/year)
PCT/SE00/01180	07 June 2000 (07.06.00)	10 June 1999 (10.06.99)

Applicant
DELAVAL HOLDING AB et al

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

   AP :GH,GM,KE,LS,MW,MZ,SD,SL,SZ,TZ,UG,ZW
   EP :AT,BE,CH,CY,DE,DK,ES,FI,FR,GB,GR,IE,IT,LU,MC,NL,PT,SE
   National :AU,BG,CA,CN,CZ,DE,IL,JP,KP,KR,MN,NO,NZ,PL,RO,RU,SE,SK,US

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

   EA :AM,AZ,BY,KG,KZ,MD,RU,TJ,TM
   OA :BF,BJ,CF,CG,CI,CM,GA,GN,GW,ML,MR,NE,SN,TD,TG
   National :AE,AL,AM,AT,AZ,BA,BB,BR,BY,CH,CR,CU,DK,DM,EE,ES,FI,GB,GD,GE,GH,
   GM,HR,HU,ID,IN,IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MW,MX,PT,SD,
   SG,SI,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

3. The applicant is reminded that he must enter the "national phase" **before the expiration of 30 months from the priority date** before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing , if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary examination report (Article 36(3)(b) and Rule 74.1).

   Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

   The entry into the European regional phase is postponed **until 31 months from the priority date** for all States designated for the purposes of obtaining a European patent.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer:
R. E. Stoffel

Telephone No. (41-22) 338.83.38

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PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No. PCT/SE 00 / 0 1 1 8 0

International Filing Date 07 -06- 2000

The Swedish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* PCT 51496sb

Box No. I TITLE OF INVENTION

"A hose device"

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

DeLaval Holding AB
P.O. Box 39
SE-147 21 Tumba
SWEDEN

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State *(that is, country)* of nationality: Sweden

State *(that is, country)* of residence: Sweden

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

ÄLVEBY, Nils
Anders Reimers väg 13
SE-117 50 Stockholm
SWEDEN

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: Sweden

State *(that is, country)* of residence: Sweden

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below ~~is hereby~~/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

BJERKENS PATENTBYRÅ KB, represented by
BERGLUND, Stefan; ISRAELSSON, Stefan;
BJERKÉN, Håkan or OLSSON, Jan

Östermalmsgatan 58
SE-114 50 Stockholm, SWEDEN

Telephone No. 08 - 662 08 70

Facsimile No. 08 - 663 02 60

Teleprinter No.

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

- [x] **AP** **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- [x] **EA** **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- [x] **EP** **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- [x] **OA** **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

- [x] **AE** United Arab Emirates
- [x] **AL** Albania
- [x] **AM** Armenia
- [x] **AT** Austria
- [x] **AU** Australia
- [x] **AZ** Azerbaijan
- [x] **BA** Bosnia and Herzegovina
- [x] **BB** Barbados
- [x] **BG** Bulgaria
- [x] **BR** Brazil
- [x] **BY** Belarus
- [x] **CA** Canada
- [x] **CH and LI** Switzerland and Liechtenstein
- [x] **CN** China
- [x] **CR** Costa Rica
- [x] **CU** Cuba
- [x] **CZ** Czech Republic and utility model
- [x] **DE** Germany and utility model
- [x] **DK** Denmark and utility model
- [x] **DM** Dominica
- [x] **EE** Estonia and utility model
- [x] **ES** Spain
- [x] **FI** Finland and utility model
- [x] **GB** United Kingdom
- [x] **GD** Grenada
- [x] **GE** Georgia
- [x] **GH** Ghana
- [x] **GM** Gambia
- [x] **HR** Croatia
- [x] **HU** Hungary
- [x] **ID** Indonesia
- [x] **IL** Israel
- [x] **IN** India
- [x] **IS** Iceland
- [x] **JP** Japan
- [x] **KE** Kenya
- [x] **KG** Kyrgyzstan
- [x] **KP** Democratic People's Republic of Korea
- [x] **KR** Republic of Korea
- [x] **KZ** Kazakhstan
- [x] **LC** Saint Lucia
- [x] **LK** Sri Lanka
- [x] **LR** Liberia
- [x] **LS** Lesotho
- [x] **LT** Lithuania
- [x] **LU** Luxembourg
- [x] **LV** Latvia
- [x] **MA** Morocco
- [x] **MD** Republic of Moldova
- [x] **MG** Madagascar
- [x] **MK** The former Yugoslav Republic of Macedonia
- [x] **MN** Mongolia
- [x] **MW** Malawi
- [x] **MX** Mexico
- [x] **NO** Norway
- [x] **NZ** New Zealand
- [x] **PL** Poland
- [x] **PT** Portugal
- [x] **RO** Romania
- [x] **RU** Russian Federation
- [x] **SD** Sudan
- [x] **SE** Sweden
- [x] **SG** Singapore
- [x] **SI** Slovenia
- [x] **SK** Slovakia and utility model
- [x] **SL** Sierra Leone
- [x] **TJ** Tajikistan
- [x] **TM** Turkmenistan
- [x] **TR** Turkey
- [x] **TT** Trinidad and Tobago
- [x] **TZ** United Republic of Tanzania
- [x] **UA** Ukraine
- [x] **UG** Uganda
- [x] **US** United States of America
- [x] **UZ** Uzbekistan
- [x] **VN** Viet Nam
- [x] **YU** Yugoslavia
- [x] **ZA** South Africa
- [x] **ZW** Zimbabwe

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- [ ]
- [ ]

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application:* regional Office	international application: receiving Office
item (1) 10 June 99 10/06/99	9902183-4	Sweden		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s): (1)

* *Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used)*:

ISA / SE

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority)*:

Date *(day/month/year)*	Number	Country *(or regional Office)*
10.06.1999	ITS/SE99/00767	SE

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	:	3 ✓
description (excluding sequence listing part)	:	9 ✓
claims	:	3 ✓
abstract	:	1 ✓
drawings	:	3 ✓
sequence listing part of description	:	
Total number of sheets	:	19 ✓

This international application is **accompanied by** the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other *(specify)*:

Figure of the drawings which should accompany the abstract: 2

Language of filing of the international application: Swedish

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Stockholm, 7 June 2000

Bjerkéns Patentbyrå KB

Stefan Berglund

For receiving Office use only

1. Date of actual receipt of the purported international application:	07 -06- 2000	2. Drawings: ☒ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA / SE	6. ☐ Transmittal of search copy delayed until search fee is paid.	

For International Bureau use only

Date of receipt of the record copy by the International Bureau: 20 JULY 2000 (20.07.00)

Fig 1

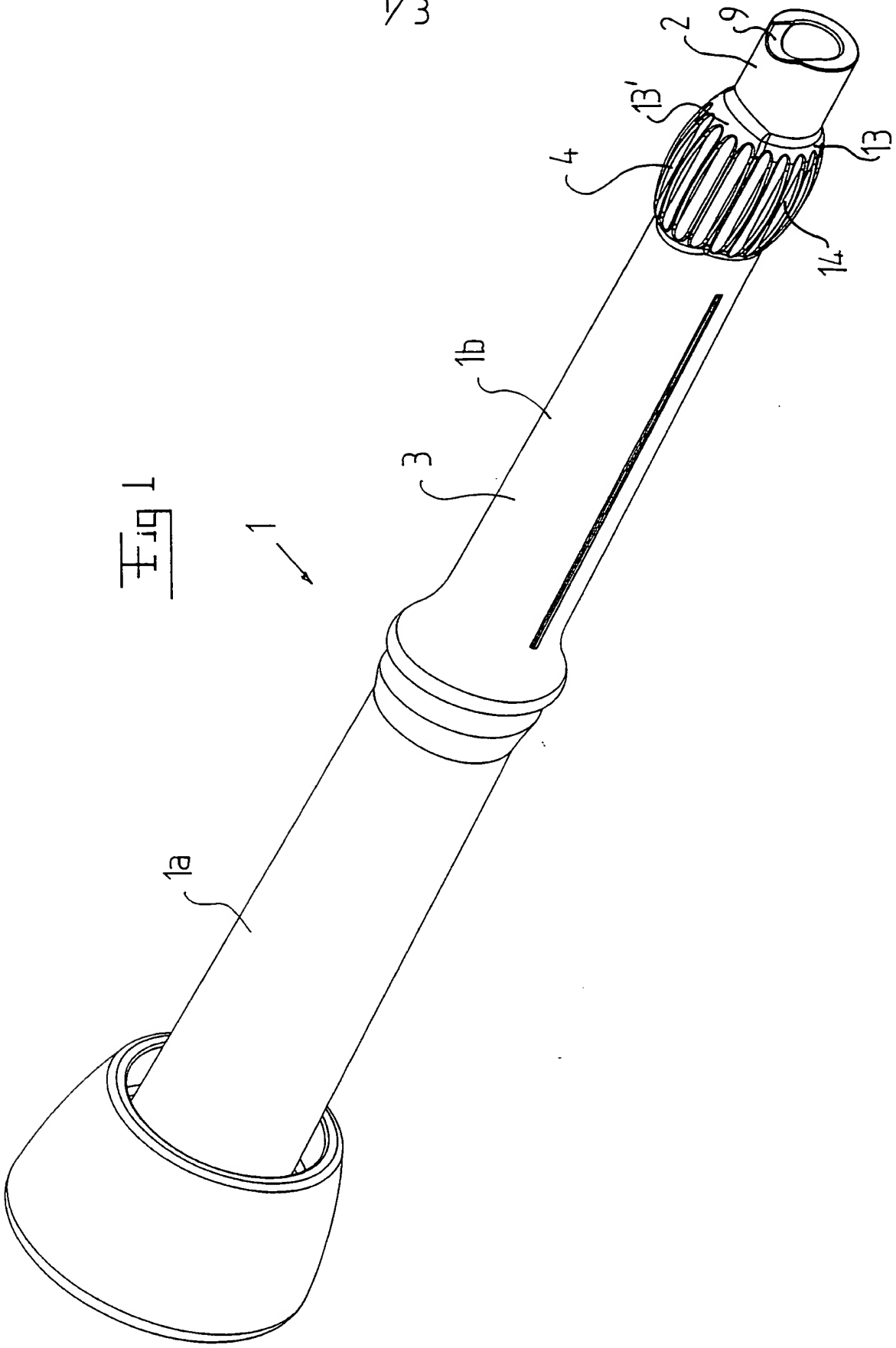


Fig 2

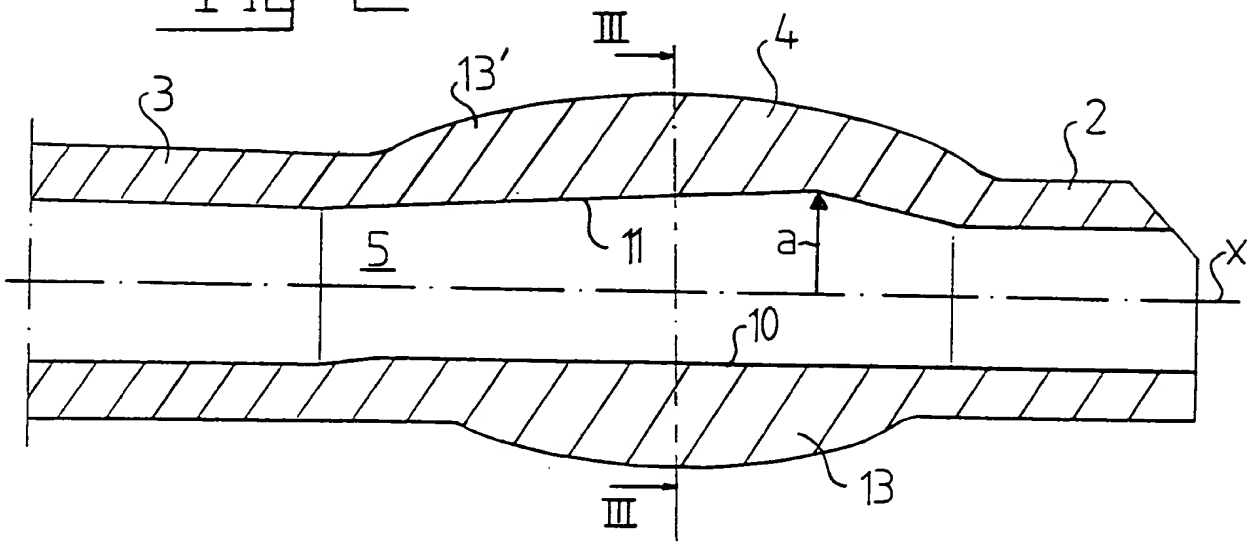


Fig 3

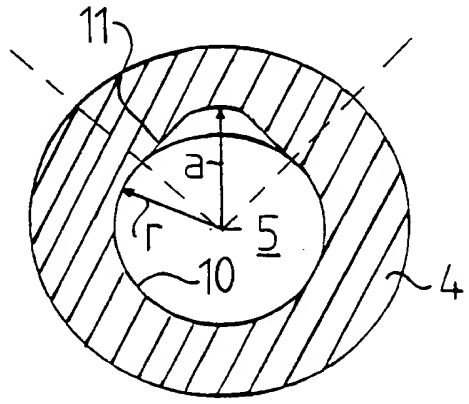


Fig 4

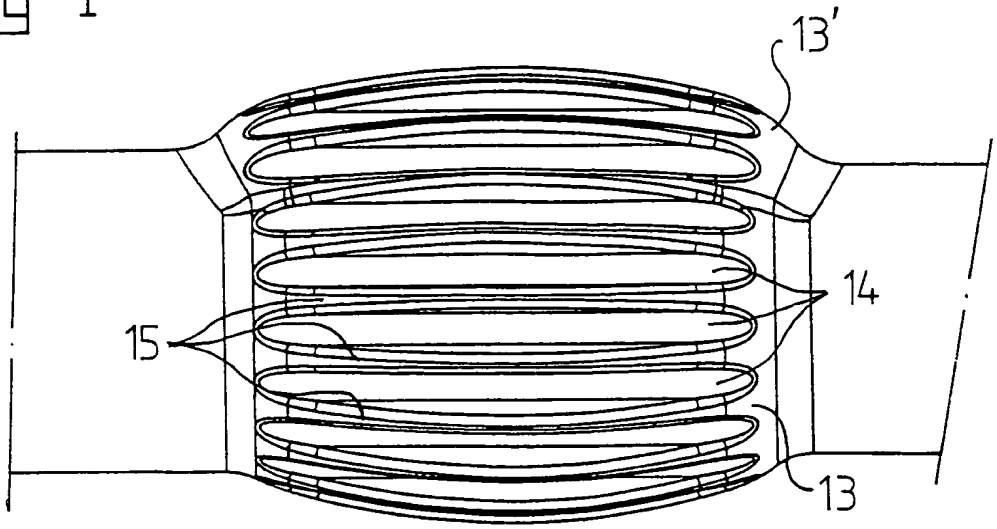
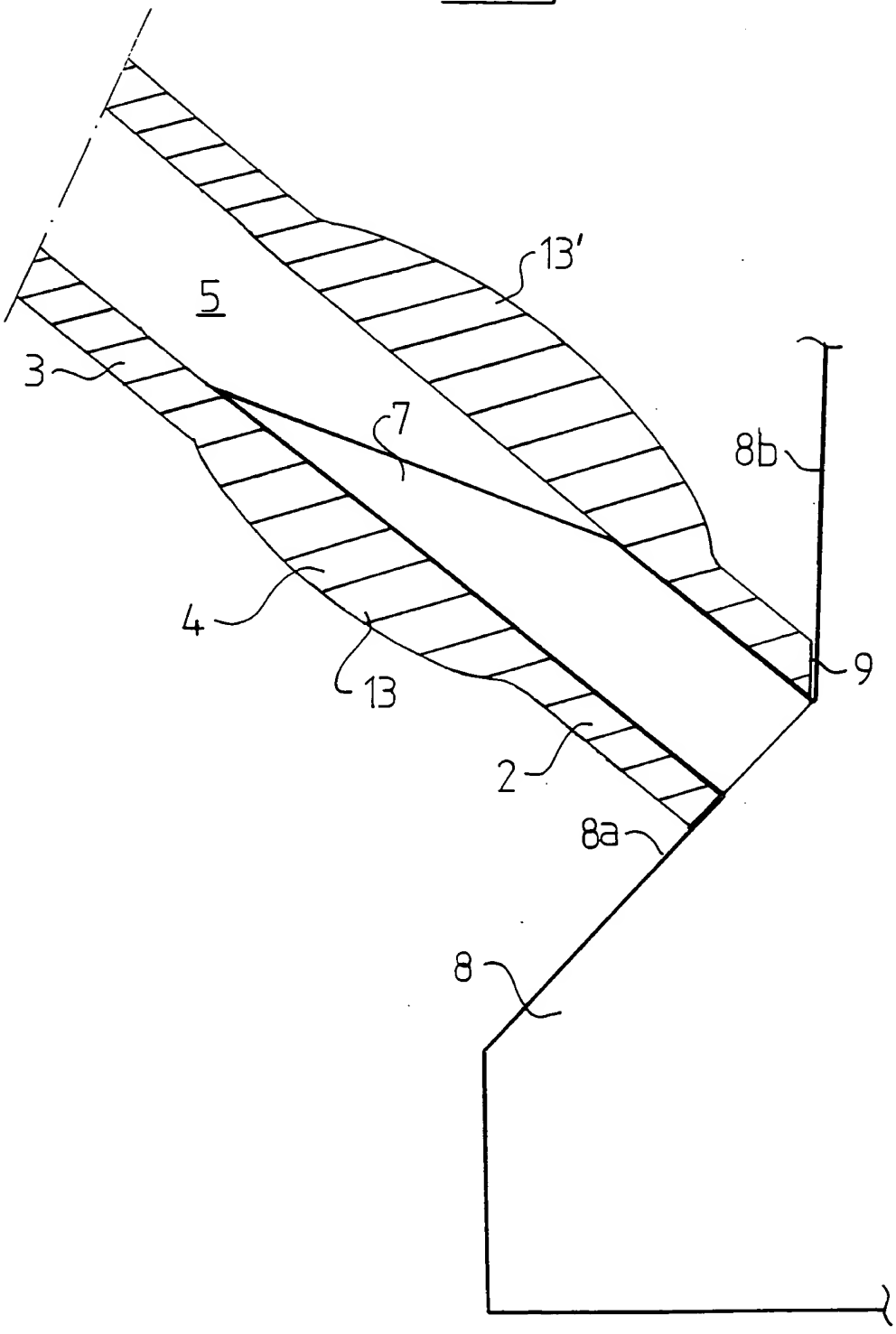


Fig 5



Slanganordning

UPPFINNINGENS BAKGRUND OCH TIDIGARE TEKNIK

Föreliggande uppfinning avser en slanganordning innefattande ett slangparti, åtminstone ett första ändparti och en kanal som sträcker sig längs slanganordningen genom det första ändpartiet och slangpartiet, varvid slanganordningen uppvisar flexibla och elastiska egenskaper, varvid slanganordningens första ändparti i ett monterat tillstånd är inrättat att fästas på ett rörformigt anslutningsorgan genom att anslutningsorganet är infört i kanalen och varvid slanganordningen innefattar ett övergångsparti som befinner sig mellan det första ändpartiet och slangpartiet.

Sådana slanganordningar innefattas av en kort mjölkledning som vanligtvis är tillverkad av ett gummiliknande material och sträcker sig mellan en spenkopp och en spenkoppscentral hos ett mjölkningsorgan. Den korta mjölkledningen kan vara en separat slang eller utgöra en del av ett spengummi som är monterat i spenkoppens hylsa. När mjölkledningen anordnas på spenkoppscentralens anslutningsorgan, som vanligtvis är utformad som en snedskuren rörnippel, deformeras mjölkledningens inre tvärsnittsform på så sätt att tvärsnittsarean minskar, d.v.s. det bildas en förträngning i ett område omedelbart utanför nippeln. En sådan förträngning hindrar ett fritt mjölkflöde genom mjölkledningen.

Patentlitteraturen innefattar en mängd dokument som beskriver sådana slanganordningar som bildar en kort mjölkledning mellan en spenkopp och en spenkoppscentral.

US-2,341,953 visar en kort mjölkslang med en vulst som sträcker sig radiellt utåt från mjölkslangen omedelbart utanför en snedskuren anslutningsnippel. Syften med vulsten är att förhindra att slangen skadas när spenkoppen faller nedåt.

US-2,694,379 visar en spengummislang med en reducerad materialtjocklek i ett område omedelbart utanför anslutningsnippeln. Syftet med denna reducering är att förbättra slangens möjlighet att stänga när spenkoppen hänger nedåt.

US-3,643,630 visar en spengummislang med en böjd ände som är avsedd att anbringas på en anslutningsnippel. Syftet med den böjda änden synes vara att förbättra spengummislangens stängningsförmåga och att säkerställa ett fritt mjölkflöde i en mjölkningsposition.

SAMMANFATTNING AV UPPFINNINGEN

Ändamålet med föreliggande uppfinning är att åstadkomma en slanganordning med vilken ovan nämnda problem kan undanröjas.

Detta ändamål uppnås med den inledningsvis angivna slanganordningen som kännetecknas av att slanganordningen innefattar ett övergångsparti som befinner sig mellan det första ändpartiet och slangpartiet, varvid kanalen sträcker sig genom övergångspartiet och i ett icke monterat tillstånd uppvisar en sådan icke cirkulär tvärsnittsform vid övergångspartiet att kanalen i det monterade tillståndet bildar en väsentligen cirkulär tvärsnittsform. På grund av inkompressibiliteten hos flexibla och elastiska material, innefattande elastomerer såsom natur- och syntetgummi, är det möjligt att utforma kanalen med en sådan osymmetrisk, icke cirkulär tvärsnittsform att den ovan nämnda deformeringen i det monterade tillståndet, d.v.s. när slanganordningens ändparti

är monterat på anslutningsorganet, resulterar i en väsentligen cirkulär tvärsnittsform hos kanalens väsentligen hela övergångsparti, d.v.s. i ett område omedelbart utanför anslutningsorganet.

Enligt en utföringsform av uppfinningen har anslutningsorganet en ändyta som är snedskuren, d.v.s. änden bildar en ringformig ändyta som lutar i förhållande till en längsgående centrumaxel hos det rörformiga anslutningsorganet, varvid slanganordningen i det monterade tillståndet är inrättad att fästas på anslutningsorganet på så sätt att anslutningsorganet sträcker sig in i övergångspartiet. Vidare kan anslutningsorganets yttre yta sedd i en tvärsnittsvy vara väsentligen cirkulär.

Enligt en ytterligare utföringsform av uppfinningen bildar nämnda tvärsnittsform hos kanalen ett första avsnitt innefattande en radie och ett andra sig utåt sträckande avsnitt. En sådan tvärsnittsform har ett ägglikнande utseende och har visat sig bilda ett väsentligen cirkulärt tvärsnitt när kanalen mottager en snedskuren rörnippel i synnerhet när slanganordningen befinner sig i ett sådant vridläge i förhållande till anslutningsorganet att det andra avsnittet i det monterade tillståndet är vänt mot den snedskurna ändytan. Vidare kan nämnda radie vara väsentligen konstant.

Enligt en ytterligare utföringsform har kanalen en längsgående centrumaxel, varvid avståndet mellan det andra avsnittet och nämnda centrumaxel är större än nämnda radie sett i ett tvärsnitt genom övergångspartiet. Vidare kan nämnda avstånd öka utmed övergångspartiet i riktning från det första ändpartiet till ett maxvärde, varefter nämnda avstånd minskar i riktning mot slangpartiet.

Enligt en ytterligare utföringsform av uppfinningen innefattar slanganordningens ändparti en ändyta som har ett avfasat

avsnitt. Med ett sådant avfasat avsnitt, som kan vara väsentligen plant eller konkavt, skapas möjligheter att förskjuta slanganordningens ändyta till anliggning mot ytterytan hos en spenkoppscentral även om spenkoppscentralen innefattar utskjutande delar som reducerar det utrymme som är tillgängligt för den korta mjölkslangen. Vidare underlättas med ett sådan avfasat avsnitt orienteringen i slanganordningens vridriktning när slanganordningen skall monteras på anslutningsorganet. Därvid är med fördel kanalens andra avsnitt och det avfasade avsnittet belägna väsentligen rakt efter varandra sett i slanganordningens utsträckning.

Enligt en ytterligare utföringsform av uppfinningen har slanganordningen åtminstone vid övergångspartiet en ytteryta som, sedd i en tvärsnittsvy, är väsentligen cirkulär. Med fördel kan slanganordningen vid övergångspartiet även ha en större väggtjocklek än vid det första ändpartiet och slangpartiet. På så vis förbättras slanganordningens hållfasthet i detta område som är utsatt för förslitning på grund av att slanganordningen exempelvis i en mjölkledningstillämpning ofta vikes. Företrädesvis innefattar slanganordningen en vulst som sträcker sig runt slanganordningen och i slanganordningens längdriktning över väsentligen hela övergångspartiet. Genom att vulsten ges en längre utsträckning i slanganordningens längriktning vid det andra avsnittet än vid det första avsnittet uppnås en ytterligare förstärkning av övergångspartiet. En sådan över ett avsnitt förläng vulst bidrar också till att uppnå en väsentligen cirkulär tvärsnittsform hos kanalen när slänganordningens första ändavsnitt är anordnat på en inloppsnippel hos en spenkoppscentral.

Enligt en ytterligare utföringsform av uppfinningen är slanganordningen på utsidan försedd med skåror som sträcker sig i slanganordningens längdriktning över väsentligen hela övergångspartiet på så sätt att slanganordningen har en

kugghjulsliknande form sedd i ett tvärsnitt genom övergångspartiet. Sådana skåror, eller närmare bestämt de längsgående utsprång som sträcker sig mellan skårorna, bidrar också till en ökad hållfasthet hos övergångspartiet som är utsatt för stora böjpåkänningar.

KORT BESKRIVNING AV RITNINGARNA

Uppfinningen skall nu förklaras närmare med hjälp av beskrivningen av en utföringsform och med hänvisning till de bifogade ritningarna.

Fig 1 visar en perspektivvy av en slanganordning enligt en utföringsform av uppfinningen.

Fig 2 visar ett längdsnitt av en del av slanganordningen i Fig 1 i ett icke monterat tillstånd.

Fig 3 visar ett tvärsnitt av slanganordningen längs linjen III-III i Fig 2.

Fig 4 en sidovy av en del slanganordningen i Fig 1.

Fig 5 visar ett längdsnitt motsvarande det i Fig 2 i ett monterat tillstånd.

DETALJERAD BESKRIVNING AV EN UTFÖRINGSFORM AV UPPFINNINGEN

Fig 1 visar en slanganordning i form av ett spengummi 1 för en spenkopp hos ett mjölkningsorgan. Spengummit 1 innefattar en övre del 1a som är avsedd att införas i en hylsa hos spenkoppen och en nedre del 1b som bildar en kort mjölkledning mellan spenkoppen och en spenkoppscentral hos mjölkningsorganet. Den övre delen 1a innefattar en öppning genom vilken spengummit 1 är avsett att mottaga en spene vid mjölkning av ett djur.

Föreliggande uppfinning kommer nu att exemplifieras med hänvisning till det visade spengummit 1 även om uppfinningen är tillämplig på andra slanganordningar som är avsedda att monteras på rörändar.

Spengummits 1 nedre del 1b innefattar ett ändparti 2, ett slangparti 3 och ett övergångsparti 4 som befinner sig mellan ändpartiet 2 och slangpartiet 3, se även Fig 2-4.

Det visade spengummit 1 är tillverkat i ett stycke av ett flexibelt och elastiskt gummimaterial. Sådana gummimaterial är väsentligen inkompressibla, d.v.s. volymen av ett materialstycke förblir i allt väsentligt konstant oavsett om det utsätts för deformationer. Dessa materialegenskaper hos gummimaterial förklaras närmare i USE OF RUBBER IN ENGINEERING av P.W. Allen, R.B. Lindley och A.R. Payne; 1967; Maclaren and Sons LTDs, London.

Spengummit 1 innefattar en kanal 5 som sträcker sig genom det första ändpartiet 2, slangpartiet 3 och övergångspartiet 4. Kanalen 5 hos spengummit 1 är inrättad att transportera mjölk från den ovan nämnda spenkoppen till spenkoppscentralen för att därifrån tillföras ett mjölkuppsamlingsorgan via en lång mjölkledning.

I en viloposition, som visas i Fig 1, sträcker sig spengummit 1 längs en längsgående axel x, se Fig 2 och 4. Spengummit 1 har en väsentligen cirkulär form sedd i ett väsentligen godtyckligt tvärsnitt vinkelrätt mot den längsgående axeln x. Den längsgående axeln x bildar kanalens 5 centrumaxel i det första ändpartiet 2 och i slangpartiet 3 när spengummit 1 befinner sig i ett vilotillstånd. Spengummits 1 väggtjocklek är väsentligen konstant längs ändpartiet 2 och slangpartiet 3. Vid övergångspartiet 4 har spengummit 1 en större väggtjocklek än vid ändpartiet 2 och slangpartiet 3.

Spengummit 1 är i ett monterat tillstånd avsett att fästas på ett anslutningsorgan 7 i form av en rörnippel. En sådan rörnippel 7 bildar ett inloppsorgan hos en spenkoppscentral, som antyds med hänvisningsbeteckning 8 i Fig 5. Spengummit 1

monteras på rörnippeln 7 genom att denna förs in i kanalen 5. Rörnippeln 7 har, såsom framgår av Fig 5 en snedskuren ändyta, d.v.s. den längsgående axeln x lutar i förhållande till ändytan med en spetsig vinkel α. Spengummit 1 monteras på rörnippeln 7 på så sätt att spengummit 1 sträcker sig fram till anliggning mot spenkoppscentralens 8 yttervägg 8a. Ändpartiet 2 har en ändyta som är försedd med en avfasning 9. Såsom framgår av Fig 5 kommer avfasningen 9 att ligga an mot en ytteryta 8b hos spenkoppscentralen. Denna ytteryta 8b definierar ett parti hos spenkoppscentralen 8 som sträcker sig uppåt från ytterväggen 8a och som är inrättat att innefatta olika funktioner, såsom exempelvis en avstängningsventil. Avfasningen 9 kan vara en väsentligen plan yta eller en krökt, konkav yta. Avfasningen 9 medger således i det visade exemplet att spengummit 1 kan skjutas fram till anliggning mot spenkoppscentralens 8 yttervägg 8a och således uppnås en definierad position för rörnippeln 7 i kanalen 5 i spengummits 1 längdriktning när spengummit 1 befinner sig i det monterade tillståndet som visas i Fig 5.

I det monterade tillståndet befinner sig således rörnippelns 7 ändyta i övergångspartiet 4. Närmare bestämt befinner sig en yttre punkt hos rörnippelns 7 ändyta vid en del av övergångspartiet 4 som gränsar till slangpartiet 3 och en inre punkt hos rörnippelns 7 ändyta, d.v.s. en punkt som befinner sig närmare spenkoppscentralen 8, vid en del av övergångspartiet 4 som gränsar till ändpartiet 2. Rörnippelns 7 ändyta eller öppning sträcker sig således över en väsentlig del av övergångspartiet 4.

Såsom framgår av Fig 2 och 3 har kanalen 5 i det icke monterade tillståndet en icke-cirkulär tvärsnittsform vid övergångspartiet 4. Närmare bestämt har kanalen 5 en äggliknande tvärsnittsform med ett första avsnitt 10 som har en väsentligen konstant radie r och ett sig utåt sträckande andra avsnitt 11. Avståndet a från kanalväggen hos det andra avsnit-

tet 11 till den längsgående axeln x är större än radien r sett i ett godtyckligt tvärsnitt genom övergångspartiet 4. Närmare bestämt är detta avstånd a ej konstant utan ökar från ett värde lika med radien r till ett maxvärde, som visas i Fig 3, för att åter minska till värdet hos radien r. Företrädesvis har kanalväggen hos det andra avsnittet 11 en radie som är mindre än radien r och vars centrumpunkt är förskjuten från den längsgående axeln x i riktning mot det andra avsnittet 11. Vid det andra avsnittet 11 har spengummit 1 således en mindre väggtjocklek än vid det första avsnittet 10 sett i ett tvärsnitt genom övergångspartiet 4. Av Fig 2 framgår även att det maximala värdet hos avståndet a ändras i spengummits 1 längdriktning x från ett värde motsvarande radien r i ett gränsområde mellan slangpartiet 3 och övergångspartiet 4 till ett maxvärde för att åter minska till värdet hos radien r i ett gränsområde mellan övergångspartiet 4 och ändpartiet 2. Tack vare den föreslagna tvärsnittsformen hos övergångspartiet 4 i det icke monterade tillståndet kommer väsentligen hela kanalen 5 när spengummit 1 är monterat på rörnippeln 7 att uppvisa en väsentligen cirkulär tvärsnittsform, jämför Fig 5.

För att erhålla en så cirkulär form som möjligt hos kanalen 5 i närheten av rörnippeln 7 är rörnippelns 7 ändyta eller öppning anordnad på ett sådant sätt att den är vänd mot det andra avsnittet 11 hos kanalen 5. Det är således väsentligt att spengummit 1 kan orienteras inte bara i längsled utan även i ett lämpligt vridningsläge. En sådan orientering underlättas av avfasningen 9 som med fördel kan vara anordnad så att den befinner sig i samma vinkelläge som det andra avsnittet 11 i förhållande till den längsgående axeln x.

Såsom framgår av Fig 1, 2, 4 och 5 innefattar spengummit 1 en vulst 13 som sträcker sig runt spengummit 1 och i spengummits 1 längdriktning längs den längsgående axeln x över väsentligen hela övergångspartiet 4. Vulsten 13 innefattar

ett vulstavsnitt 13' som utmed en del av omkretsen hos övergångspartiet 4 har en förlängd utsträckning i spengummits 1 längdriktning x. Detta förlängda vulstavsnitt 13' befinner sig vid det andra avsnittet 11, d.v.s. över det första avsnittet 10. Såsom framgår av Fig 1 och 4 är spengummit 1 vid övergångspartiet 4, d.v.s. på vulsten 13 försett med längsgående urtagningar eller skåror 14 på utsidan på så sätt att spengummit 1 har en kugghjulsliknande form sedd i ett tvärsnitt genom övergångspartiet 4. Skårorna 14 sträcker sig väsentligen parallellt med varandra och med den längsgående axeln x och mellan intilliggande skåror 14 bildas ett längsgående utsprång 15. Skårorna 14 är ej visade i Fig 2, 3 och 5.

Föreliggande uppfinning är inte begränsad till den visade utföringsformen utan kan varieras och modifieras inom ramen för de efterföljande patentkraven. Det skall speciellt noteras att uppfinningen även är tillämpbar på andra slanganordningar än spengummin 1. Exempelvis kan den tillämpas på den långa mjölkledningen mellan spenkoppscentralen och mjölkuppsamlingsorganet eller på andra slangar hos en mjölkningsmaskin eller andra slangar som ej är avsedda att transportera mjölk utan andra vätskor och/eller gaser.

Patentkrav

1. Slanganordning innefattande ett slangparti (3), åtminstone ett första ändparti (2) och en kanal (5) som sträcker sig längs slanganordningen genom det första ändpartiet (2) och slangpartiet (3), varvid slanganordningen (1) uppvisar flexibla och elastiska egenskaper, varvid slanganordningens första ändparti (2) i ett monterat tillstånd är inrättat att fästas på ett rörformigt anslutningsorgan (7) genom att anslutningsorganet är infört i kanalen (5) och varvid slanganordningen innefattar ett övergångsparti (4) som befinner sig mellan det första ändpartiet och slangpartiet, kännetecknad av att kanalen (5) sträcker sig genom övergångspartiet (4) och i ett icke monterat tillstånd uppvisar en sådan icke cirkulär tvärsnittsform vid övergångspartiet (4) att kanalen i det monterade tillståndet bildar en väsentligen cirkulär tvärsnittsform.

2. Anordning enligt krav 1, kännetecknad av att anslutningsorganet (7) har en ändyta som är snedskuren, varvid slanganordningen (1) i det monterade tillståndet är inrättad att fästas på anslutningsorganet (7) på så sätt att anslutningsorganet sträcker sig in i övergångspartiet (4).

3. Anordning enligt något av kraven 1 och 2, kännetecknad av att anslutningsorganet (7) har en yttre yta som sedd i en tvärsnittsvy är väsentligen cirkulär.

4. Anordning enligt något av de föregående kraven, kännetecknad av att kanalen (5) i det icke monterade tillståndet uppvisar en ägglikнande tvärsnittsform.

5. Anordning enligt något av de föregående kraven, kännetecknad av att nämnda tvärsnittsform hos kanalen (5) bildar ett första avsnitt (10) innefattande en radie (r) och ett andra sig utåt sträckande avsnitt (11).

6. Anordning enligt kraven 2 och 5, kännetecknad av att slanganordningen (1) är inrättad att befinna sig i ett sådant vridläge i förhållande till anslutningsorganet (7) att det andra avsnittet i det monterade tillståndet är vänt mot den snedskurna ändytan.

7. Anordning enligt något av kraven 5 och 6, kännetecknad av att nämnda radie (r) är väsentligen konstant.

8. Anordning enligt något av kraven 5 till 7, kännetecknad av att kanalen (5) har en längsgående centrumaxel (x), varvid avståndet (a) mellan det andra avsnittet (11) och nämnda centrumaxel (x) är större än nämnda radie (r) sett i ett tvärsnitt genom övergångsavsnittet (4).

9. Anordning enligt något av kraven 5 till 8, kännetecknad av att nämnda avstånd (a) ökar utmed övergångspartiet (4) i riktning från det första ändpartiet (2) till ett maxvärde, varefter nämnda avstånd (a) minskar i riktning mot slangpartiet (3).

10. Anordning enligt något av de föregående kraven, kännetecknad av att det första ändpartiet (2) innefattar en ändyta som har ett avfasat avsnitt (9).

11. Anordning enligt kraven 5 och 10, kännetecknad av att kanalens (5) andra avsnitt (11) och det avfasade avsnittet (9) är belägna väsentligen rakt efter varandra sett i slanganordningens utsträckning.

12. Anordning enligt något av de föregående kraven, kännetecknad av att slanganordningen åtminstone vid övergångspartiet (4) har en ytteryta som, sedd i en tvärsnittsvy, är väsentligen cirkulär.

13. Anordning enligt något av de föregående kraven, kännetecknad av att slanganordningen vid övergångspartiet (4) har en större väggtjocklek än vid det första ändpartiet (2) och slangpartiet (3).

14. Anordning enligt något av de föregående kraven, kännetecknad av en vulst (13) som sträcker sig runt slanganordningen och i slanganordningens längdriktning (x) över väsentligen hela övergångspartiet (4).

15. Anordning enligt kraven 5 och 14, kännetecknad av att vulsten (13) har en längre utsträckning i slanganordningens längdriktning (x) vid det andra avsnittet (11) än vid det första avsnittet (10).

16. Anordning enligt något av de föregående kraven, kännetecknad av att slanganordningen på utsidan är försedd med skåror (14) som sträcker sig i slanganordningens längdriktning (x) över väsentligen hela övergångspartiet (4) på så sätt att slanganordningen har en kugghjulsliknande form sedd i ett tvärsnitt genom övergångspartiet (4).

Sammandrag

En slanganordning innefattar ett slangparti (3), åtminstone ett första ändparti (2) och en kanal (5) som sträcker sig längs slanganordningen (1) genom det första ändpartiet och slangpartiet. Slanganordningen uppvisar flexibla och elastiska egenskaper. Slanganordningens första ändparti (2) är i ett monterat tillstånd inrättat att fästas på ett rörformigt anslutningsorgan (7) genom att anslutningsorganet är infört i kanalen (5). Slanganordningen har ett övergångsparti (4) som befinner sig mellan det första ändpartiet (2) och slangpartiet (3). Kanalen (5) sträcker sig således även genom övergångspartiet och uppvisar, vid övergångspartiet (4), i ett icke monterat tillstånd en icke cirkulär tvärsnittsform och i det monterade tillståndet en väsentligen cirkulär tvärsnittsform som medger ett fritt vätskeflöde genom kanalen (5).

(Fig 2)

PATENT COOPERATION TREATY

PCT

REC'D 02 OCT 2001
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT 51496sb	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SE00/01180	International filing date *(day month year)* 07.06.2000	Priority date *(day month year)* 10.06.1999
International Patent Classification (IPC) or national classification and IPC7 A01J 5/04, A01J 5/08, F16L 35/00		
Applicant DELAVAL HOLDING AB et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
02.01.2001	12.09.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Telex 17978 PATOREG-S Facsimile No. 08-667 72 88	Authorized officer Magnus Thoren/js Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE00/01180

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-16	YES
	Claims		NO
Inventive step (IS)	Claims	1-16	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The present invention relates to a hose device with an end portion intended to be fitted on a tube. The invention is characterised in that the hose has a transition portion which cross-section in relaxed non-mounted state is non-circular, but becomes circular in the mounted state.

Among the cited documents, the only one revealing a tube end with a cross-section that is non-circular is US 2694379, but this end portion is not intended to be mounted on a tube, only close to its end, and it does not alter shape in a mounted state.

Thus, the invention is novel. The invention is not considered obvious to a person skilled in the art, and it is industrially applicable..

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 00/01180

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A01J 5/04, A01J 5/08, F16L 35/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A01J, F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2694379 A (H.W. HEIN), 16 November 1954 (16.11.54) --	
A	US 3643630 A (DUNCAN), 22 February 1972 (22.02.72) --	
A	US 5080041 A (STEINGRABER), 14 January 1992 (14.01.92) --	
A	US 4196696 A (OLANDER), 8 April 1980 (08.04.80) -- --------	16

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 Sept 2000	29 -09- 2000
Name and mailing address of the ISA Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Magnus Thorén/js Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/SE 00/01180

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2694379 A	16/11/54	NONE	
US 3643630 A	22/02/72	AU 6538674 A	02/05/74
		BE 773452 A	31/01/71
		CA 936826 A	13/11/73
US 5080041 A	14/01/92	NONE	
US 4196696 A	08/04/80	AT 129378 A	15/04/81
		AT 364665 B	10/11/81
		AU 513273 B	20/11/80
		AU 3343478 A	30/08/79
		BE 862854 A	12/07/78
		BR 7801043 A	03/10/78
		CA 1079217 A	10/06/80
		CH 625391 A	30/09/81
		DE 2804503 A,B,C	04/01/79
		DE 7803094 U	13/07/78
		DK 76478 A	23/08/78
		DK 150881 B,C	13/07/87
		FI 64259 B,C	29/07/83
		FI 780144 A	23/08/78
		FR 2380724 A,B	15/09/78
		GB 1559165 A	16/01/80
		IE 46130 B	23/02/83
		IT 1091851 B	06/07/85
		IT 7819042 D	00/00/00
		JP 53103889 A	09/09/78
		NL 187044 B,C	17/12/90
		NL 7800558 A	24/08/78
		NO 141679 B,C	14/01/80
		NO 780271 A	23/08/78
		NZ 186294 A	21/02/80
		PL 204781 A	23/10/78
		SE 404286 B,C	02/10/78
		SE 7701928 A	22/08/78
		ZA 7800180 A	27/12/78

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(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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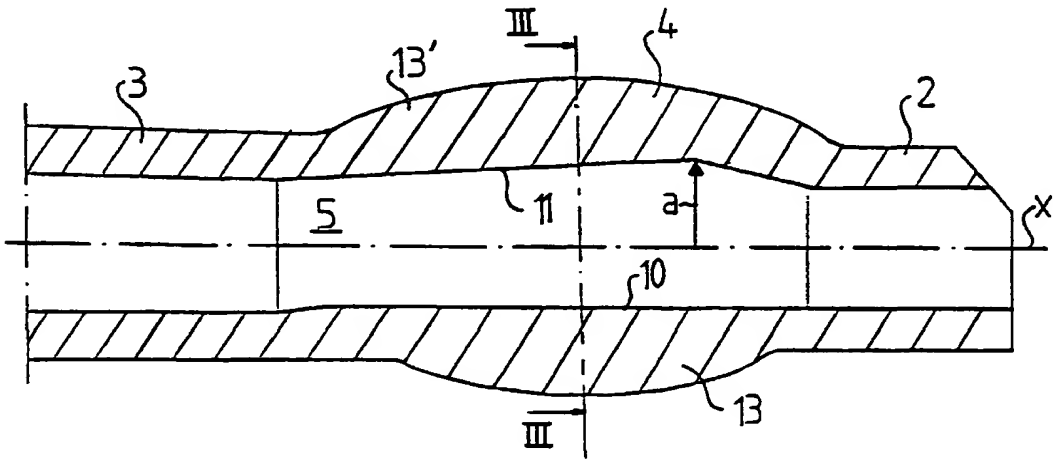
(54) Title: A HOSE DEVICE



(57) Abstract: A hose device includes a hose portion (3), at least a first end portion (2) and a channel (5) which extends along the hose device (1) through the first end portion and the hose portion. The hose device has flexible and elastic properties. The first end portion (2) of the hose device is in a mounted state arranged to be attached to a tubular connection member (7) by having the connection member introduced in the channel (5). The hose device has a transition portion (4), which is located between the first end portion (2) and the hose portion (3). The channel (5) thus extends also through the transition portion and has, at the transition portion (4), in a non-mounted state a non-circular cross-sectional shape and in the mounted state a substantially circular cross-sectional shape, which permits a free liquid flow through the channel (5).

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A HOSE DEVICE

THE BACKGROUND OF THE INVENTION AND PRIOR ART

The present invention refers to a hose device including a hose portion, at least a first end portion and a channel, which extends along the hose device through the first end portion and the hose portion, wherein the hose device has flexible and elastic properties, wherein the first end portion of the hose device in a mounted state is arranged to be attached to a tubular connection member by having the connection member introduced in the channel and wherein the hose device includes a transition portion, which is located between the first end portion and the hose portion.

Such hose devices are comprised by a short milk conduit, which normally is manufactured in a rubber-like material and extends between a teatcup and a teatcup claw of a milking member. The short milk conduit may be a separate hose or be a part of a teatcup liner, which is mounted in the shell of the teatcup. When the milk conduit is provided on the connection member of the teatcup claw, which normally is designed as an obliquely cut pipe nipple, the inner cross-sectional shape of the milk conduit is deformed in such a way that the cross-sectional area is reduced, i.e. a constriction is formed in an area immediately outside the nipple. Such a constriction prevents a free milk flow through the milk conduit.

The patent literature includes several documents describing such hose devices, which form a short milk conduit between a teatcup and a teatcup claw.

US-2,341,953 discloses a short milk hose having a bead which extends radially outwardly from the milk hose immediately outside an obliquely cut connection nipple. The purpose of the bead is to prevent the hose from being damaged when the teatcup is falling downwardly.

US-2,694,379 discloses a teatcup liner hose having a reduced thickness of material in an area immediately outside the connection portion. The purpose of this reduction is to improve the possibility of the hose to close when the teatcup is hanging downwardly.

US-3,643,630 discloses a teatcup liner hose having a bended end, which is intended to be attached to a connection nipple. The purpose of the bended end appears to be to improve the closing capability of the teatcup liner hose and to ensure a free milk flow in a milking position.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a hose device by which the problems mentioned above may be remedied.

This purpose is obtained by the hose device initially defined, which is characterised in that the channel extends through the transition portion and in a non-mounted state has such a non-circular cross-sectional shape at the transition portion that the channel in the mounted state forms a substantially circular cross-sectional shape. Due to the incompressibility of flexible and elastic materials, including elastomers such as natural and synthetic rubber, it is possible to design the channel with such a non-symmetric, non-circular cross-sectional shape that the deformation mentioned above in the mounted state, i.e. when

the end portion of the hose device is mounted to the connection member, results in a substantially circular cross-sectional shape of substantially the whole transition portion of the channel, i.e. in an area immediately outside the connection member.

According to an embodiment of the invention, the connection member has an end surface, which is obliquely cut, i.e. the end forms an annular end surface which is inclined in relation to a longitudinal centre axis of the tubular connection member, wherein the hose device in the mounted state is arranged to be attached to the connection member in such a way that the connection member extends into the transition portion. Furthermore, the outer surface of the connection member may, seen in a cross-sectional view, be substantially circular.

According to a further embodiment of the invention, said cross-sectional shape of the channel forms a first portion including a radius and a second outwardly extending portion. Such a cross-sectional shape has an egg-like appearance and has proved to form a substantially circular cross-section when the channel receives an obliquely cut pipe nipple, especially when the hose device is positioned in such a rotary position in relation to the connection member that the second portion in the mounted state is directed towards the obliquely cut end surface. Furthermore, said radius may be substantially constant.

According to a further embodiment, the channel has a longitudinal centre axis, wherein the distance between the second portion and said centre axis is larger than said radius seen in a cross-section through the transition portion. Furthermore, said distance may increase along the transition portion in a direction from the first end portion

to a maximum value, whereafter said distance decreases in a direction towards the hose portion.

According to a further embodiment of the invention, the end portion of the hose device includes an end surface, which has a chamfered portion. By such a chamfered portion, which may be substantially plane or concave, possibilities are created to displace the end surface of the hose device to abutment against the outer surface of a teatcup claw even if the teatcup claw includes projecting portions reducing the space being available to the short milk hose. Furthermore, by such a chamfered portion, the orientation in the rotary direction of the hose device is facilitated when the hose device is to be mounted to the connection member. Thereby, the second portion of the channel and the chamfered portion are advantageously located substantially straight after each other seen in the extension of the hose device.

According to a further embodiment of the invention, the hose device has at least at the transition portion an outer surface, which, seen in a cross-sectional view, is substantially circular. Advantageously, the hose device may at the transition portion also have a larger wall thickness than at the first end portion and the hose portion. In such a way, the strength of the hose device is improved in this area, which is subjected to wear due to the hose device frequently being bent, for instance in a milk conduit application. Preferably, the hose device includes a bead, which extends around the hose device and in the longitudinal direction of the hose device over substantially the whole transition portion. By giving the bead a longer extension in the longitudinal direction of the hose device at the second portion than at the first portion, a further strengthening of the transition portion is obtained. Such a prolonged bead over a portion also contributes to the achievement of a substantially circular cross-sectional shape of the channel

when the first end portion of the hose device is provided on an inlet nipple of a teatcup claw.

According to a further embodiment of the invention, the hose device is on the outer side provided with grooves, which extend in the longitudinal direction of the hose device over substantially the whole transition portion in such a way that the hose device has a tooth wheel-like shape seen in a cross-section through the transition portion. Such grooves, or more exactly the longitudinal projections extending between the grooves, also contribute to an improved strength of the transition portion, which is subjected to larger bending stresses.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is now to be explained by means of the description of an embodiment and with reference to the drawings attached.

Fig 1 discloses a perspective view of a hose device according to an embodiment of the invention.

Fig 2 discloses a longitudinal section of a part of the hose device in Fig 1 in a non-mounted state.

Fig 3 discloses a cross-section of the hose device along the line III-III in Fig 2.

Fig 4 discloses a side-view of a part of the hose device in Fig 1.

Fig 5 discloses a longitudinal section corresponding to the one in Fig 2 in a mounted state.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

Fig 1 discloses a hose device in the form of a teatcup liner 1 for a teatcup of a milking member. The teatcup liner 1 includes an upper part 1a which is intended to be introduced

into a shell of the teatcup, and a lower part 1b, which forms a short milk conduit between the teatcup and a teatcup claw of the milking member. The upper part 1a includes an opening through which the teatcup liner is intended to receive a teat during milking of an animal.

The present invention will now be exemplified with reference to the teatcup liner 1 disclosed even if the invention is applicable to other hose devices intended to be mounted to pipe ends.

The lower part 1b of the teatcup liner 1 includes an end portion 2, a hose portion 3 and a transition portion 4, which is located between the end portion 2 and the hose portion 3, see also Figs 2-4.

The teatcup liner 1 disclosed is manufactured in one piece of a flexible and elastic rubber material. Such rubber materials are substantially incompressible, i.e. the volume of a piece of material remains substantially constant independently of the fact if it is subjected to deformations. This material properties of rubber materials are explained more closely in USE OF RUBBER IN ENGINEERING by P.W. Allen, R.B. Lindley and A-R. Payne; 1967; Maclaren and Sons LTDs, London

The teatcup liner 1 includes a channel 5, which extends through the first end portion 2, the hose portion 3 and the transition portion 4. The channel 5 of the teatcup liner 1 is arranged to transport milk from the teatcup mentioned above to the teatcup claw in order to be supplied therefrom to a milk-collecting member via a long milk conduit.

In a rest position, which is disclosed in Fig 1, the teatcup liner 1 extends along a longitudinal axis x, see Figs 2 and 4. The teatcup liner 1 has a substantially circular shape

seen in a substantially arbitrary cross-section perpendicular to the longitudinal axis x. The longitudinal axis x forms the centre axis of the channel 5 in the first end portion 2 and in the hose portion 3 when the teatcup liner 1 is located in a rest state. The wall thickness of the teatcup liner 1 is substantially constant along the end portion 2 and the hose portion 3. At the transition portion 4, the teatcup liner 1 has a larger wall thickness than at the end portion 2 and the hose portion 3.

The teatcup liner 1 is in a mounted state intended to be attached to a connection member 7 in the form of a pipe nipple. Such a pipe nipple 7 forms an inlet member of the teatcup claw, which is indicated by the reference sign 8 in Fig 5. The teatcup liner 1 is mounted to the pipe nipple 7 by guiding the latter into the channel 5. The pipe nipple 7 has, as appears from Fig 5, an obliquely cut end surface, i.e. the longitudinal axis x is inclined in relation to the end surface by an acute angle α. The teatcup liner 1 is mounted to the pipe nipple 7 in such a way that the teatcup liner 1 extends to abutment against the outer wall 8a of the teatcup claw 8. The end portion 2 has an end surface, which is provided with a chamfer 9. As apppears from Fig 5, the chamfer 9 will abut an outer surface 8b of the teatcup claw. This outer surface 8b defines a portion of the teatcup claw 8, which extends upwardly from the outer wall 8a and which is arranged to include different functions, such as for instance a closing valve. The chamfer 9 may be a substantially plane surface or a curved, concave surface. Consequently, the chamfer 9 permits, in the example disclosed, the teatcup liner 1 to be displaced to abutment against the outer wall 8a of the teatcup claw 8, and thus a defined position of the pipe nipple 7 in the channel 5 in the longitudinal direction of the teatcup liner is defined when the teatcup liner 1 is in the mounted state which is disclosed in Fig 5.

In the mounted state, the end surface of the pipe nipple 7 thus is located in the transition portion 4. More precisely, an outer point of the end surface of the pipe nipple 7 is located at a part of the transition portion 4, which adjoins the hose portion 3 and an inner point of the end surface of the pipe nipple 7, i.e. a point, which is located more closely to the teatcup claw 8, at a part of the transition portion 4, which adjoins the end portion 2. The end surface or opening of the pipe nipple 7 thus extends over a substantial part of the transition portion 4.

As appears from Figs 2 and 3, the channel 5 has in the non-mounted state a non-circular cross-sectional shape at the transition portion 4. More precisely, the channel 5 has an egg-like cross-sectional shape having a first portion 10, which has a substantially constant radius r and an outwardly extending second portion 11. The distance a from the channel wall of the second portion 11 to the longitudinal axis x is greater than the radius r seen in an arbitrary cross-section through the transition portion 4. More precisely, this distance a is not constant but increases from a value which is equal to the radius r to a maximum value, which is disclosed in Fig 3, and decreases again to the value of the radius r. Preferably, the channel wall of the second portion 11 has a radius, which is less than the radius r and the centre point of which is displaced from the longitudinal axis x in a direction towards the second portion 11. At the second portion 11, the teatcup liner 1 thus has a smaller wall thickness than at the first portion 10 seen in a cross-section through the transition portion 4. From Fig 2 also appears that the maximum value of the distance a is changed in the longitudinal direction x of the teatcup liner 1 from a value corresponding to the radius r in a border area between the hose portion 3 and the transition portion 4 to a maximum value and decreases again to the value of the radius

r in a border area between the transition portion 4 and the end portion 2. Thanks to the proposed cross-sectional shape of the transition portion 4 in the non-mounted state, substantially the whole channel 5 will have, when the teatcup liner 1 is mounted to the pipe nipple 7, a substantially circular cross-sectional shape, compare Fig 5.

In order to achieve a shape as circular as possible in the channel 5 in the proximity of the pipe nipple 7, the end surface or the opening of the pipe nipple 7 is provided in such a manner that it faces the second portion 11 of the channel 5. Consequently, it is essential that the teatcup liner 1 may be oriented not only in the longitudinal direction but also in a suitable rotary position. Such a orientation is facilitated by the chamfer 9, which advantageously may be provided in such a way that it is located in the same angle position as the second portion 11 in relation to the longitudinal axis x.

As appears from Figs 1, 2, 4 and 5, the teatcup liner 1 includes a bead 13, which extends around the teatcup liner 1 and in the longitudinal direction of the teatcup liner 1 along the longitudinal axis x over substantially the whole transition portion 4. The bead 13 includes a bead portion 13', which along a part of the periphery of the transition portion 4 has a prolonged extension in the longitudinal direction x of the teatcup liner 1. This prolonged bead portion 13' is located at the second portion 11, i.e. the first portion 10. As appears from Figs 1 and 4, the teatcup liner 1 is at the transition portion 4, i.e. on the bead 13, provided with longitudinal recesses or grooves 14 on the outer side in such a way that the teatcup liner has a tooth wheel-like shape seen in a cross-section through the transition portion 4. The grooves 14 extend substantially parallel to each other and to the longitudinal axis x, and a longitudinal projection 15 is formed between adjacent

grooves 14. The grooves 14 are not disclosed in Figs 2, 3 and 5.

The present invention is not limited to the embodiment disclosed but may be varied and modified within the scope of the following claims. It is in particular to be noted that the invention also is applicable to other hose devices than teatcup liners 1. For instance, it may be applied to the long milk conduit between the teatcup claw and the milk-collecting member, or to other hoses of a milking machine or other hoses, which are not intended to transport milk but other liquids and/or gases.

Claims

1. A hose device including a hose portion (3), at least a first end portion (2) and a channel (5), which extends along the hose device through the first end portion (2) and the hose portion (3), wherein the hose device (1) has flexible and elastic properties, wherein the first end portion (2) of the hose device in a mounted state is arranged to be attached to a tubular connection member (7) by having the connection member introduced in the channel (5) and wherein the hose device includes a transition portion (4), which is located between the first end portion and the hose portion, characterised in that the channel (5) extends through the transition portion (4) and in a non-mounted state has a such non-circular cross-sectional shape at the transition portion (4) that the channel in the mounted state forms a substantially circular cross-sectional shape.

2. A device according to claim 1, characterised in that the connection member (7) has an end surface, which is obliquely cut, wherein the hose device (1) in the mounted state is arranged to be attached to the connection member (7) in such a way that the connection member extends into the transition portion (4).

3. A device according to any one of claims 1 and 2, characterised in that the connection member (7) has an outer surface, which seen in a cross-sectional view is substantially circular.

4. A device according to any one of the preceding claims, characterised in that the channel (5) in the non-mounted state has an egg-like cross-sectional shape.

5. A device according to any one of the preceding claims, characterised in that said cross-sectional shape of the

channel (5) forms a first portion (10) including a radius (r) and a second outwardly extending portion (11).

6. A device according to claims 2 and 5, characterised in that the hose device (1) is arranged to be located in such a rotary position in relation to the connection member (7) that the second portion in the mounted state is directed towards the obliquely cut end surface.

7. A device according any one of claims 5 and 6, characterised in that said radius (r) is substantially constant.

8. A device according to any one of claims 5 to 7, characterised in that the channel (5) has a longitudinal centre axis (x), wherein the distance (a) between the second portion (11) and said centre axis (x) is larger than said radius (r) seen in a cross-section through the transition portion (4).

9. A device according to any one of claims 5 to 8, characterised in that said distance (a) increases along the transition portion (4) in a direction from the first end portion (2) to a maximum value, whereafter said distance (a) decreases in a direction towards the hose portion (3).

10. A device according to any one the preceding claims, characterised in that the first end portion (2) includes an end surface which has a chamfered portion (9).

11. A device according to claims 5 and 10, characterised in that the second portion (11) of the channel (5) and the chamfered portion (9) are located substantially straight after each other seen in the extension of the hose device.

12. A device according to any one of the preceding claims, characterised in that the hose device at least at the transition portion (4) has an outer surface, which seen in a cross-sectional view is substantially circular.

13. A device according to any one of the preceding claims, characterised in that the hose device at the transition portion (4) has a larger wall thickness than at the first end portion (2) and the hose portion (3).

14. A device according to any one of the preceding claims, characterised by a bead (13), which extends around the hose device and in the longitudinal direction (x) of the hose device over substantially the whole transition portion (4).

15. A device according to claims 5 and 14, characterised in that the bead (13) has a longer extension in the longitudinal direction (x) of the hose device at the second portion (11) than at the first portion (10).

16. A device according to any one of the preceding claims, characterised in that the hose device at the outer side is provided with grooves (14) which extend in the longitudinal direction (x) of the hose device over substantially the whole transition portion (4) in such a way that the hose device has a tooth wheel-like shape seen in a cross-section through the transition portion (4).

Fig 1

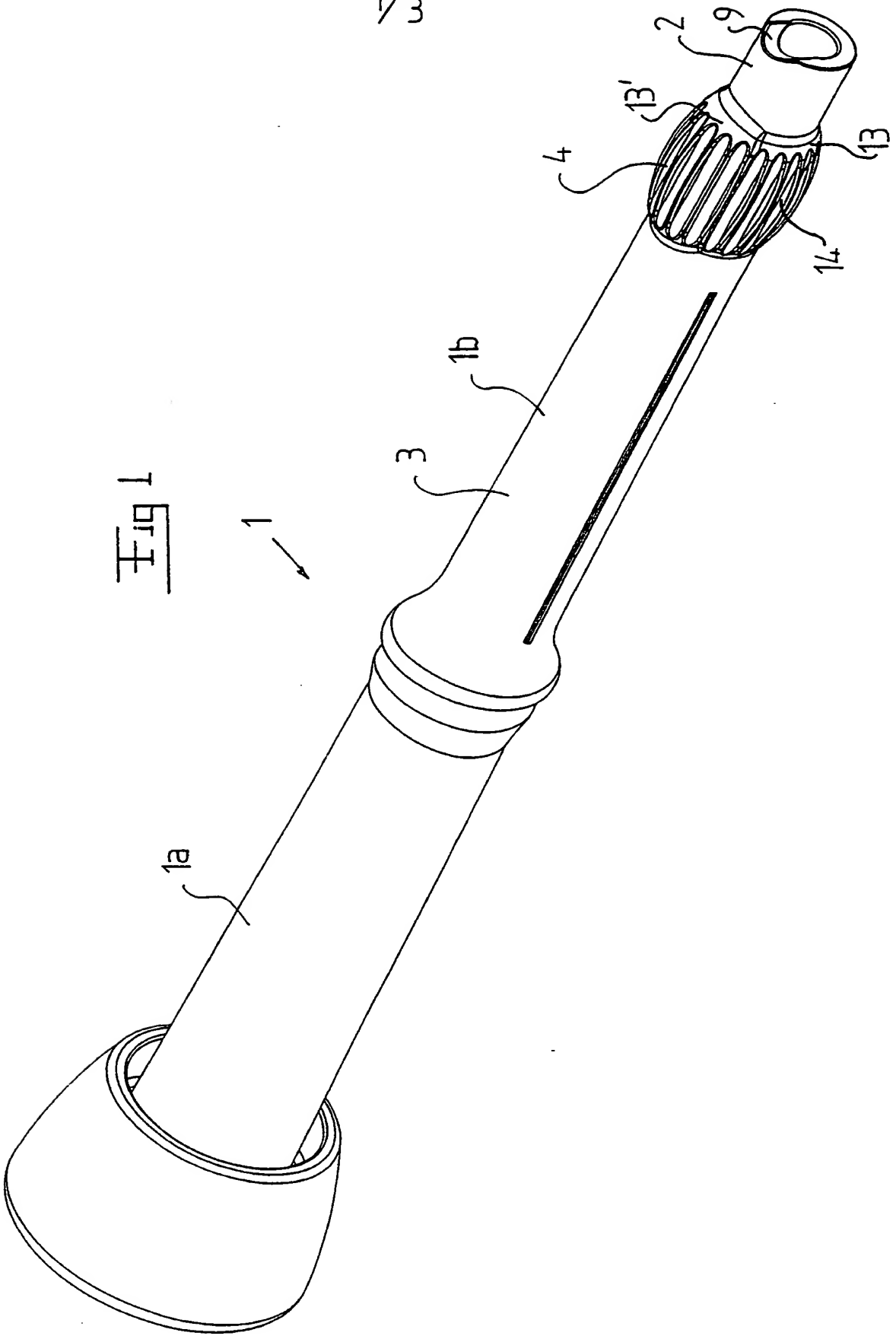

Fig 2

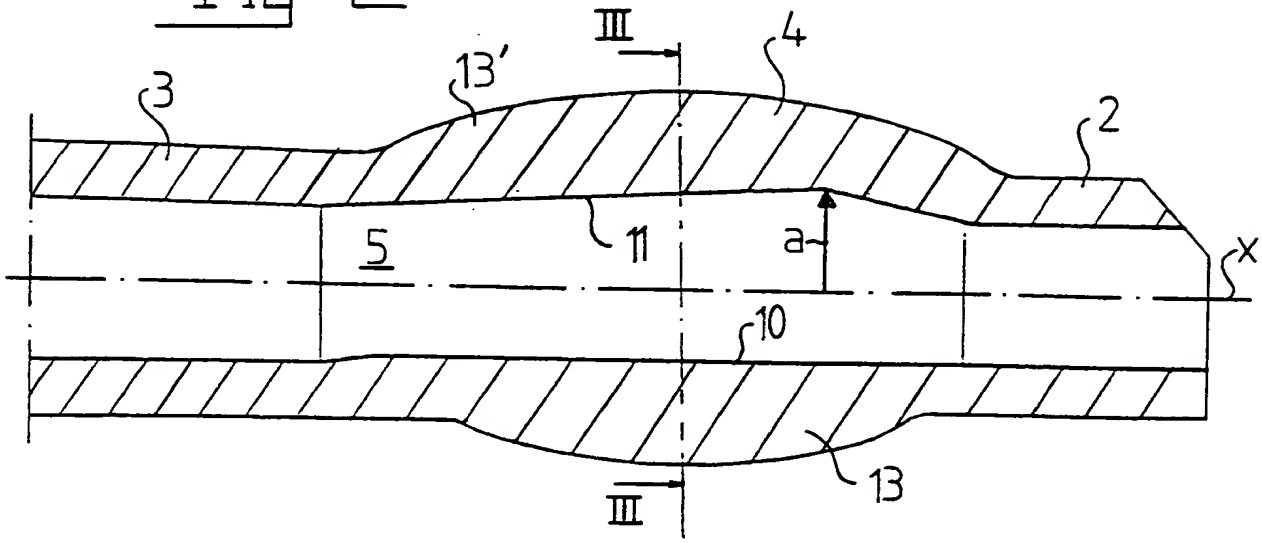

Fig 3

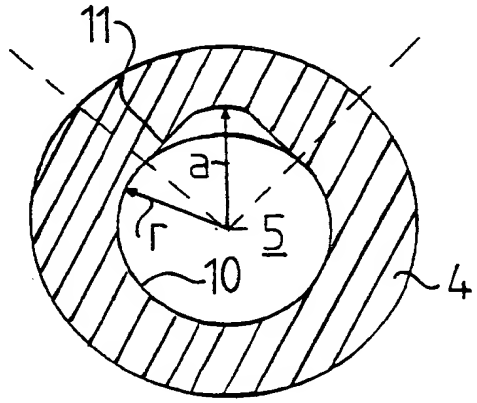

Fig 4

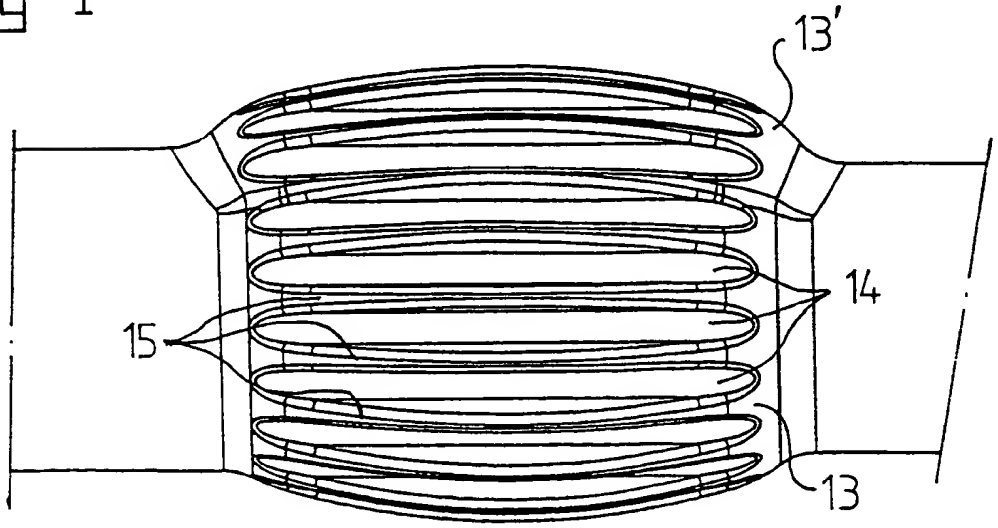

Fig 5